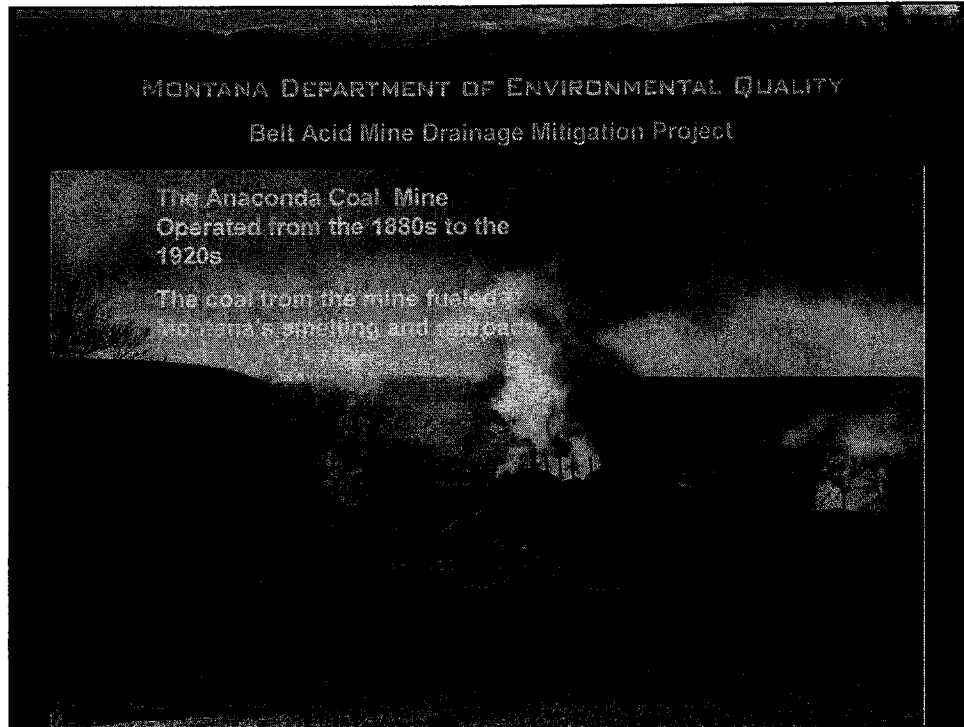


- The Belt AMD Mitigation Project is located at the small town of Belt along Belt Creek.
- The site is ~22 mi. east-southeast of the city of Great Falls in Cascade County.
- The population of Belt is 610 by 2005 estimates.
- The economy is primarily from agriculture

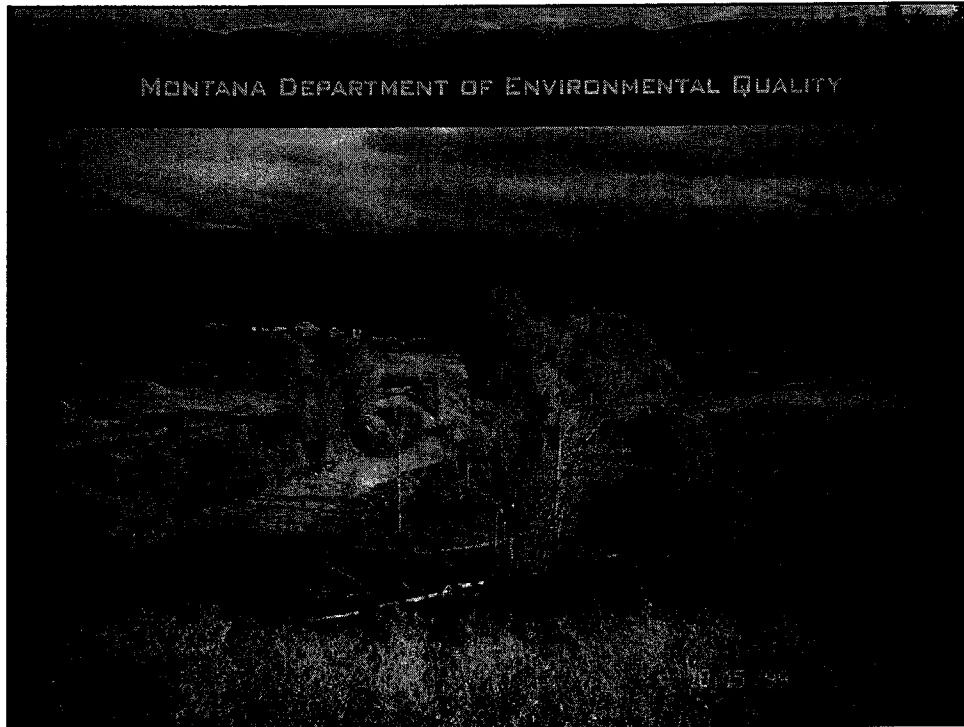


- The abandoned Anaconda Coal Mine operated from the 1880s to the 1920s.

- This photo shows the mine operation circa 1900. In the foreground is Belt Creek. Note the piles of waste encroaching the creek, also note in the background is Kastner Coulee and on the left of the photo is the bluff that was mined into.

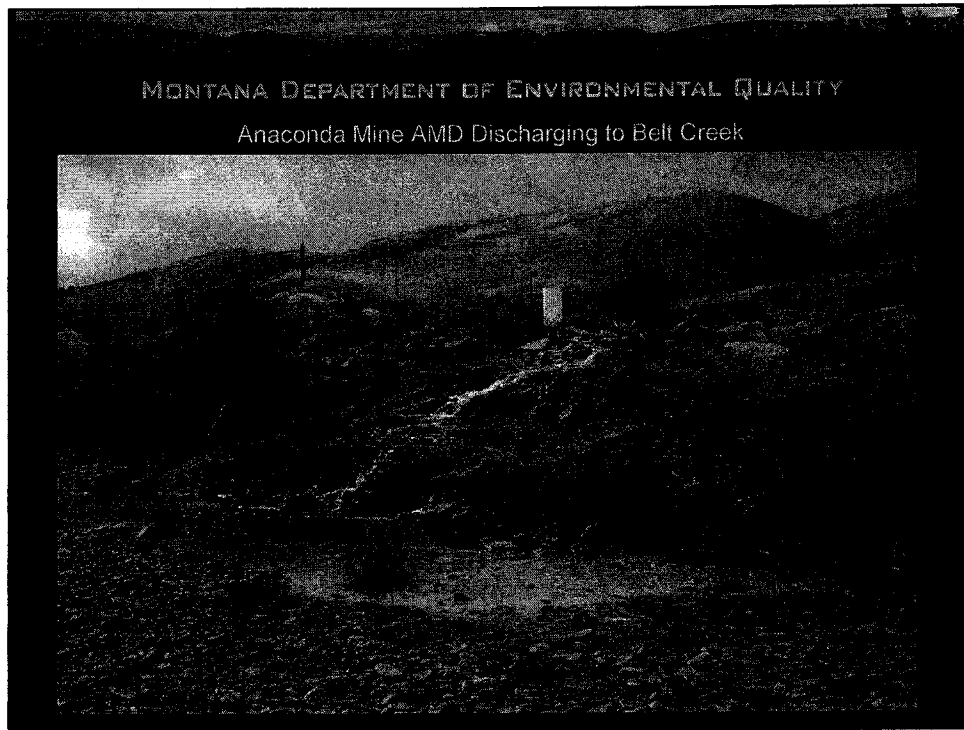
- Montana Dept. of State Lands under Title IV of SMCRA reclaimed these coal waste features (coal slack, slag and debris) in the 1980s.

- However, Acid Mine Drainage (AMD) was not addressed at that time and this acid drainage from the mine remains today a problem for Belt Creek



The abandoned Anaconda Coal Mine site is the state's number 1 priority site for coal because of the acid drainage which is impacting Belt Creek.

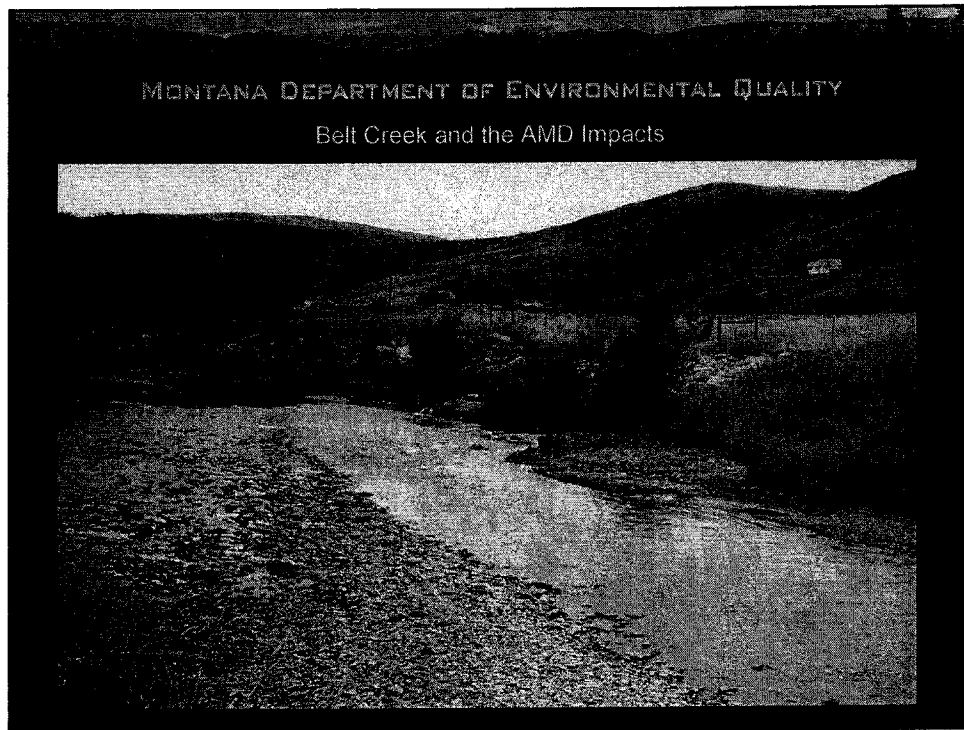
The right fore-ground of photo is state property where 100,000 to 150,000 cubic yards of coal waste, primarily slag, was buried during the initial reclamation. Just discernable is the ditch with brings the acid drainage from the mine discharges to the creek. Note the color of the creek the result of this drainage.



- This shows the acid drainage entering the Belt Creek. Note the white PVC pipe stand, it will show in the next slide.

- The red-brown water is from the metals in mine water precipitating out as the low pH water mixes with the more neutral pH of the creek water.

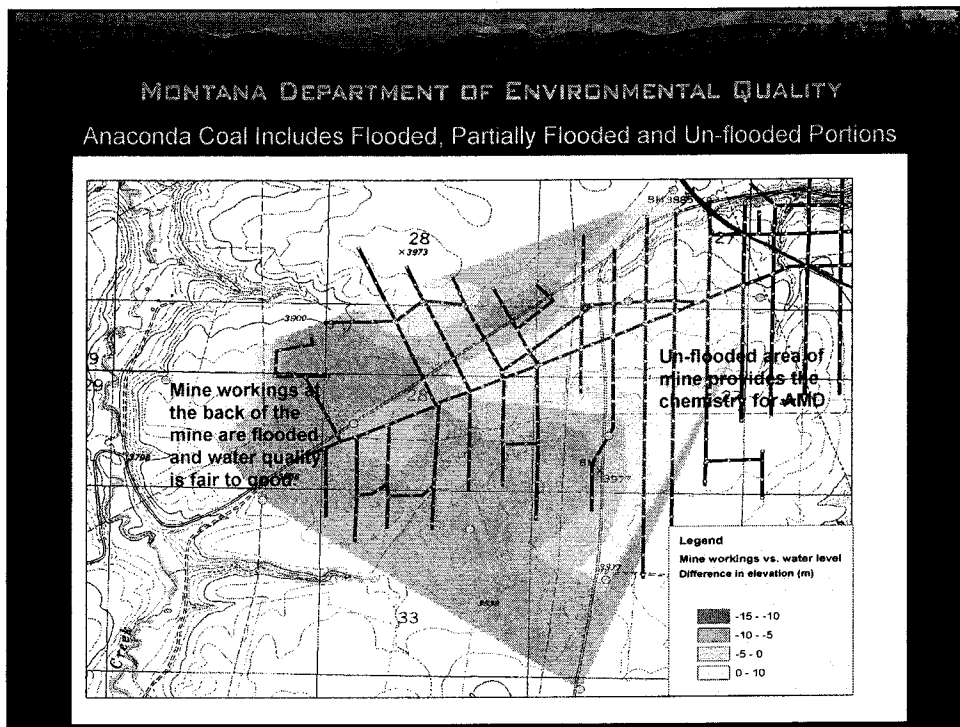
- This precipitation coats the creek streambed for miles downstream decimating aquatic life in the creek



- This slide shows the discharge of acid drainage to the creek in the center of the of the photo. The ditch running through the floodplain above the creek is where the coal waste is buried. You can just see the white pipe stand from the previous slide.
- The upstream of the discharge point shows local youngsters ready to enjoy a summer dip at the "Swimming Hole", a 12 feet deep depression in the streambed.



- Anaconda Coal Mine workings overlain on an aerial photo of the project area.
- Mine workings cover approximately 3 sq. miles
- Since the mine's closure, groundwater has seeped into the mine dissolving metals which then drains from the closed mine portal into Belt Creek at 150 to 200 gpm and a pH less than 3.
- The acid drainage is laden with metals: iron; aluminum; copper; chromium; lead; cadmium; and, zinc



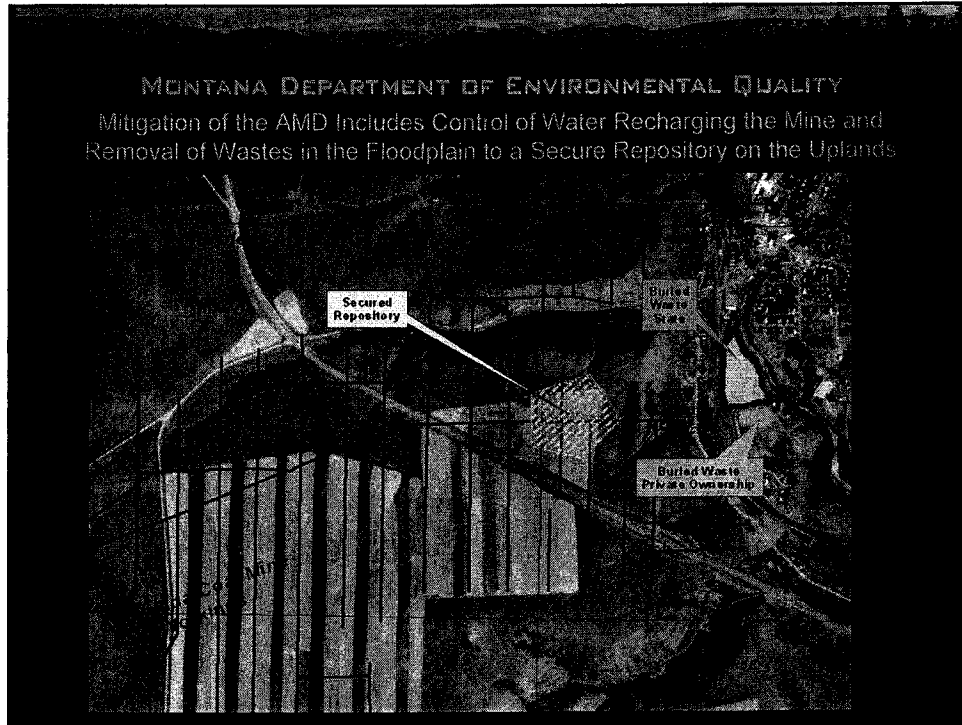
Our investigations show that the mine workings are completely flooded at the back of the mine (western) area.

The water quality in this portion of the mine is fairly good, at a minimum stock water use appropriate.

The draining portion of the mine (shown in pale yellow) is responsible for the acid generation.

Pyrite in the mined strata, oxygen and water in this un-flooded area of the mine result in an acid mixture of metals.

The goal to mitigate the acid drainage from the mine requires controlling the groundwater entering the un-flooded areas where the acid generating conditions are present.



Source Control simply put is controlling, or eliminating, the cause of contamination. To control one sources of contamination, we will remove the waste in the floodplain, and place the waste in a engineered/lined repository out of the floodplain.

Source Control measures for the groundwater entering the unflooded portions of the mine will be accomplished in three ways:

- 1. Bulkheads will be installed in the mine to isolate the flooded areas of the mine from the unflooded area, eliminating any flow within the mine;**
- 2. Horizontal well will be installed in the strata above the mine to intercept shallow groundwater from reaching the mine workings; and,**
- 3. Changes in agricultural practices in the land over the unflooded areas of the mine will eliminate the annual recharge to the shallow aquifers.**

MONTANA DEPARTMENT OF ENVIRONMENTAL QUALITY

Summary of Belt AMD Mitigation

Funding for this project is \$1,482,100 from Office of Surface Mining Project Grants and \$300,000 from RIT Grant.

The Total Estimated Cost for the project is \$1,782,100.

Consequently, Source Control is Montana's preferred solution to acid mine water from mines. Previously used passive treatment methods for large mine discharges have not proven successful in Montana and active treatment systems are cost-prohibitive.

Source Control involves cutting off groundwater recharge to the mine using a variety of methods including: tailings to isolate the fractured portions of the mine from the unflooded horizontal veins in the shale above the mine to intercept groundwater recharge and land use changes to reduce the annual meteoric recharge above the mine.

Buried wastes in floodplain from earlier reclamation require a separate source and drainage to Belt Creek. These wastes will be excavated and removed to a secure (lined) repository on the uplands. (on property to be purchased by the state)

The cost for this project is \$1,782,100. \$1,482,100 will come from a Office of Surface Mining project grant, and this RIT grant for \$300,000 will provide the necessary funding.

To summarize: Source Control solutions to acid drainage from mines is the preferred mitigation method for Montana. Passive treatment methods tried in Montana have not been successful and active treatment of these discharges is cost-prohibitive.

Mitigation for the acid drainage to Belt Creek will be accomplished by eliminating groundwater flow through the unflooded areas of the mine.

Wastes buried in the floodplain along Belt Creek will be removed and placed in a repository on the uplands above Belt Drainage

MONTANA DEPARTMENT OF ENVIRONMENTAL QUALITY

Benefits Resulting from Mitigation of the AMD at Belt

- Belt Creek is a viable fishery upstream of Belt. Eliminating the acid drainage to Belt Creek will allow aquatic life to re-establish itself.
- The quality of life for the citizens of Belt will be improved.
- The project work will provide jobs and stimulate the local economy.
- The public health will be protected.
- The environment will be protected and improved.

BENEFITS

Eliminating the acid drainage to the creek will allow aquatic life to re-establish itself in the reaches impacted

This will improve the quality of life for the citizens of Belt;

Project work will provide jobs and stimulate the local economy;

Property values will be improved;

The public health will be protected; and,

The environment will be protected and improved

Montana State Legislature

Exhibit 8

**This exhibit is a full colored
map 61 cm X 61 cm. Entitled;
Map showing the MBMG CBM
MONITORING SITES**

**Montana & Wyoming borders
The original exhibit is on
file at the Montana
Historical Society and can
be viewed there.**

**Montana Historical Society
Archives, 225 N. Roberts, Helena,
MT 59620-1201
Phone (406) 444-4774.**

Scanning by: Susie Hamilton